

CLAIMS

1. An electronic pointing or cursor control device comprising a first chamber and a second chamber, wherein:
the two chambers are adjoined and separated by a fluid-tight separating wall;
the first chamber contains electronic components;
the second chamber comprises an aperture;
the second chamber contains a ball, the ball protruding through said aperture;
the said separating wall comprises an optically permeable region; and
the electronic components include optical detection means directed towards the optically permeable region and the ball, the detection means being operable in use to detect motion of the ball and to generate electronic signals representative of said motion.
2. A device as claimed in Claim 1, wherein the first chamber is fluid-tight.
3. A device as claimed in Claim 1 or Claim 2, wherein the distance in the second chamber between the surface of said optically permeable region and the surface of the ball is sufficiently small such that any liquid between the ball and the optically permeable region of the separating wall is thinly dispersed and does not prevent optical transmission between the ball and the detection means.
4. A device as claimed in any preceding Claim, wherein the distance in the second chamber between the surface of said optically permeable region and the surface of the ball is less than 1.5 mm.

5. A device as claimed in any preceding Claim, wherein the detection means comprise an optical lens, the focal depth of said lens being such as to ensure that, irrespective of the nature of any liquid between the ball and the optically permeable region of the separating wall, the detection means are sufficiently focused to enable the device to operate.
6. A device as claimed in any preceding Claim, wherein the separating wall is made of a translucent plastics material.
7. A device as claimed in Claim 6, wherein the optically permeable region of the separating wall comprises a polished region of the said plastics material.
8. A device as claimed in any preceding Claim, wherein the second chamber further comprises a drainage outlet.
9. A device as claimed in Claim 8, wherein the second chamber further comprises a cleaning fluid inlet.
10. A device as claimed in any preceding Claim, wherein the second chamber contains cleaning liquid.
11. A device as claimed in any preceding Claim, wherein the optical detection means are mounted in a position substantially on a diametric line through the ball normal to the mounting plane of the device.

12. A device as claimed in any of Claims 1 to 10, wherein the optical detection means are mounted at an angular position around the circumference of the ball such that a radial line from the ball to the detection means forms a non-zero angle with a diametric line through the ball normal to the mounting plane of the device.
13. A device as claimed in Claim 12, wherein the optical detection means are mounted at an angular position around the circumference of the ball such that a radial line from the ball to the detection means forms a non-zero angle of between 0° and 20° with a diametric line through the ball normal to the mounting plane of the device.
14. A device as claimed in Claim 12, wherein the optical detection means are mounted at an angular position around the circumference of the ball such that a radial line from the ball to the detection means forms a non-zero angle of between 20° and 50° with a diametric line through the ball normal to the mounting plane of the device.
15. A device as claimed in Claim 14, further comprising processing means configured to apply vector transformations to the signals generated by the detection means in order to compensate for the angular position at which the detection means are mounted.
16. A device as claimed in Claim 12, wherein the optical detection means are mounted at an angular position around the circumference of the ball such that a radial line from the ball to the detection means forms an angle of substantially 90° with a diametric line through the ball normal to the mounting plane of the device.

17. A device as claimed in Claim 16, wherein the optical detection means comprise two optical detectors mounted in mutually orthogonal positions with respect to said diametric line.
18. A device as claimed in any preceding Claim being a trackball.
19. A device as claimed in any of Claims 1 to 8 or Claims 11 to 17 being a mouse.
20. An electronic pointing or cursor control device comprising a ball and optical detection means responsive to movement of the ball, the optical detection means being operable in use to detect motion of the ball and to generate electronic signals representative of said motion, wherein the detection means are mounted at an angular position around the circumference of the ball such that a radial line from the ball to the detection means forms a non-zero angle with a diametric line through the ball normal to the mounting plane of the device.
21. A device as claimed in Claim 20, wherein the optical detection means are mounted at an angular position around the circumference of the ball such that a radial line from the ball to the detection means forms an angle of substantially 90° with a diametric line through the ball normal to the mounting plane of the device.
22. A device as claimed in Claim 21, wherein the optical detection means comprise two optical detectors mounted in mutually orthogonal positions with respect to said diametric line.

23. A device as claimed in Claim 20, wherein the optical detection means are mounted at an angular position around the circumference of the ball such that a radial line from the ball to the detection means forms a non-zero angle of between 0° and 20° with a diametric line through the ball normal to the mounting plane of the device.
24. A device as claimed in Claim 20, wherein the optical detection means are mounted at an angular position around the circumference of the ball such that a radial line from the ball to the detection means forms an angle of between 20° and 50° with a diametric line through the ball normal to the mounting plane of the device.
25. A device as claimed in Claim 24, further comprising processing means configured to apply vector transformations to the signals generated by the optical detection means in order to compensate for the angle at which the detection means are mounted.
26. A device as claimed in any of Claims 20 to 25, wherein the device further comprises a first chamber and a second chamber, and wherein:
- the two chambers are adjoined and separated by a fluid-tight separating wall;
 - the first chamber contains electronic components;
 - the second chamber comprises an aperture;
 - the second chamber contains the ball, the ball protruding through said aperture;
 - the said separating wall comprises an optically permeable region; and
 - the electronic components include optical detection means directed towards the optically permeable region and the ball.
27. A device as claimed in Claim 26, wherein the first chamber is fluid-tight.

28. A device as claimed in Claim 26 or Claim 27, wherein the distance in the second chamber between the surface of said optically permeable region and the surface of the ball is sufficiently small such that any liquid between the ball and the optically permeable region of the separating wall is thinly dispersed and does not prevent optical transmission between the ball and the detection means.
29. A device as claimed in any of Claims 26 to 28, wherein the distance in the second chamber between the surface of said optically permeable region and the surface of the ball is less than 1.5 mm.
30. A device as claimed in any of Claims 26 to 29, wherein the detection means comprise an optical lens, the focal depth of said lens being such as to ensure that, irrespective of the nature of any liquid between the ball and the optically permeable region of the separating wall, the detection means are sufficiently focused to enable the device to operate.
31. A device as claimed in any of Claims 26 to 30, wherein the separating wall is made of a translucent plastics material.
32. A device as claimed in Claim 31, wherein the optically permeable region of the separating wall comprises a polished region of the said plastics material.
33. A device as claimed in any of Claims 26 to 32, wherein the second chamber further comprises a drainage outlet.

34. A device as claimed in Claim 33, wherein the second chamber further comprises a cleaning fluid inlet.
35. A device as claimed in any of Claims 26 to 34, wherein the second chamber contains cleaning liquid.
36. A device as claimed in any of Claims 20 to 35 being a trackball.
37. A device as claimed in any of Claims 20 to 33 being a mouse.
38. An electronic pointing or cursor control device substantially as hereinbefore described with reference to any combination of the accompanying drawings.